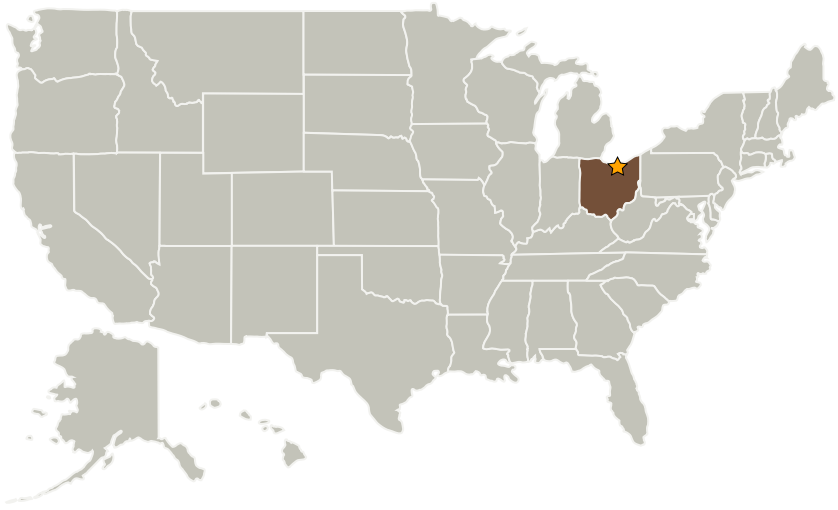
Optimal Shockwave Boundary Layer Interaction Control for Supersonic Mixed Compression Inlets, Phase I

Completed Technology Project (2009 - 2009)

Project Introduction

SynGenics Corporation proposes a program that incorporates systems engineering processes, Response Surface Methods, and state-of-the-art numerical methods to develop optimized, fail safe technologies to control shockwave boundary layer interactions and demonstrate improvements in supersonic mixed compression inlet performance. Specific program objectives are to apply structured, mathematically based methods to evaluate, compare, rate, and downselect flow control concepts that will enable improved inlet stability and control shockwave boundary layer interactions in supersonic, mixed compression inlets, to develop and demonstrate an approach to flow control system design and optimization based on designed experiments and response surface methodology, and to obtain a better understanding of the physics driving supersonic inlet performance improvements enabled by fail safe, supersonic inlet flow control and quantify the benefit in terms of inlet total pressure recovery and dynamic distortion. The significance of this program is that it will provide inlet system-level assessments of flow control technologies, including stationary micro-devices, active devices, and hybrid systems comprised of stationary and active devices. In addition, this program will quantify flow control effectiveness in terms of total pressure recovery and distortion computed at the inlet/engine aerodynamic interface plane. This program supports the Propulsion Efficiency key research area of the NASA Fundamental Aeronautics Supersonics Program by working to develop fail safe inlet flow control technologies that will facilitate low TSFC of highly integrated supersonic inlets and improved overall cruise efficiency through reduced inlet drag.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
SynGenics Corporation	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Delaware, Ohio

Primary U.S. Work Locations
Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.5 Propulsion Flowpath and Interactions